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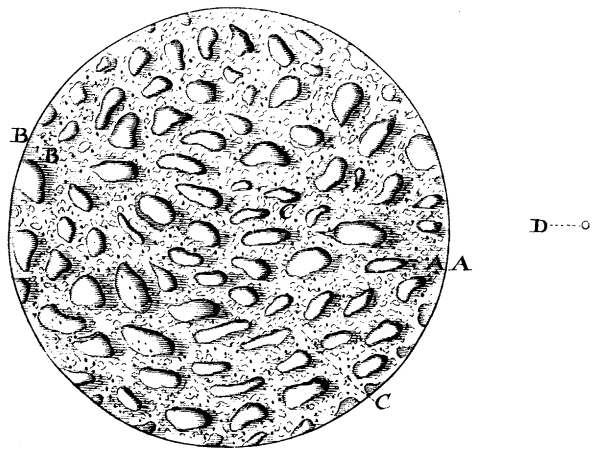
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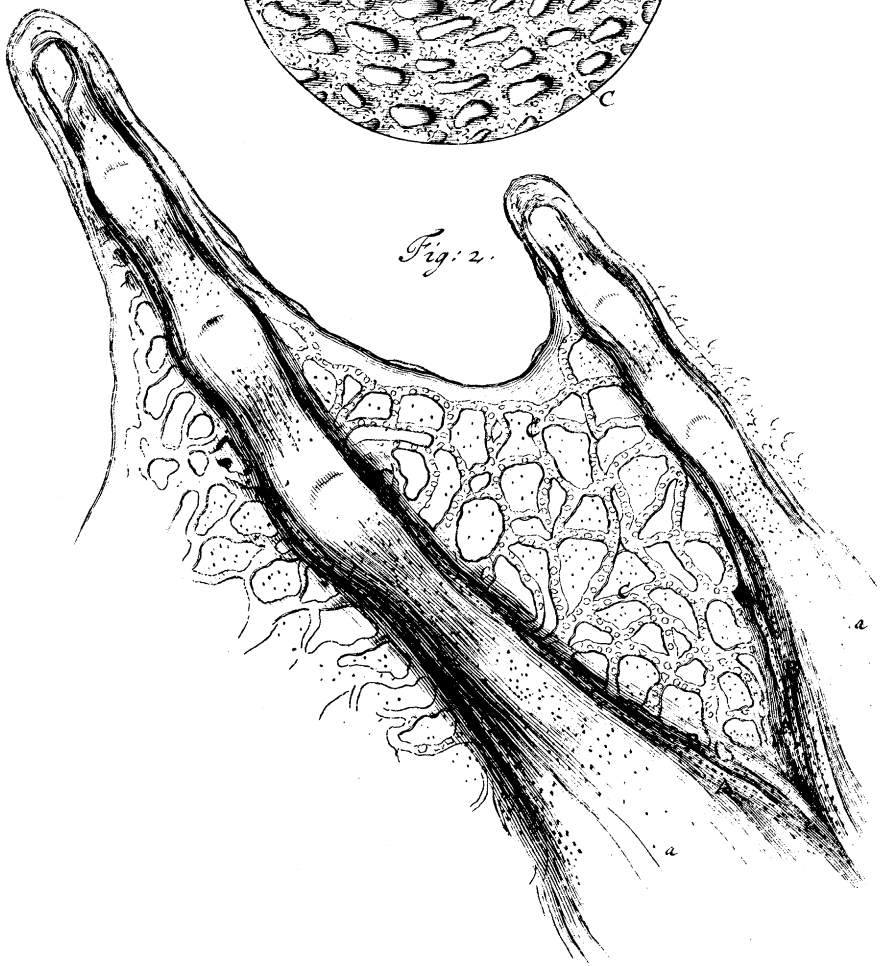
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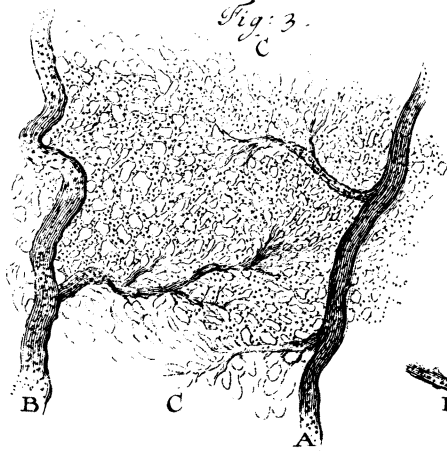
*Fig: 1.*



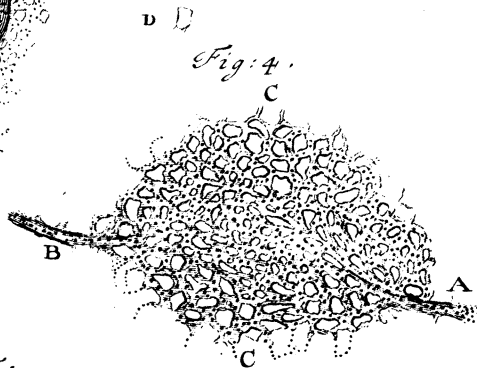
*Fig: 2.*



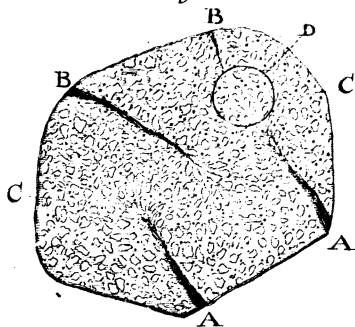
*Fig: 3.*



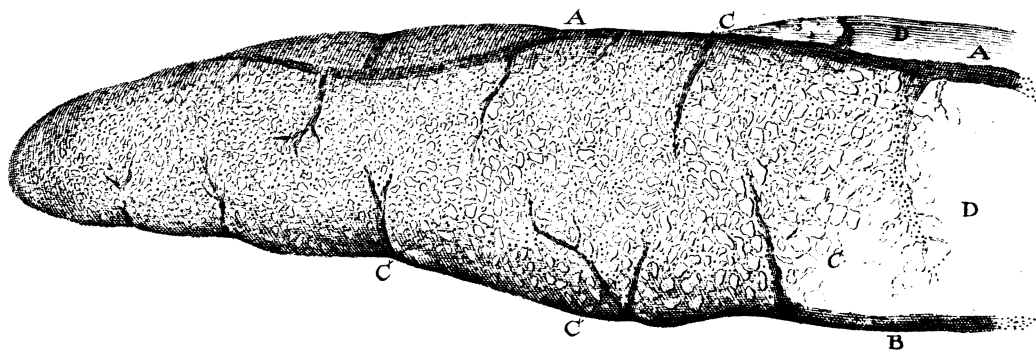
*Fig: 4.*



*Fig: 5.*



*Fig: 6.*



II. *An Answer to Dr Wright's Letter, concerning the Cure of an Aposthimation of the Lungs, by William Cowper, F. R. S.*

S I R,

**H**AD we more such Communications as you are pleased to favour us with, the Publick as well as my self would have reason to be thankful. *Observations* unquestionably are the best Charts in Medicinal Practice; but *they* must like *yours* be genuine, and not fram'd in favour of any Hypothesis; when the Relator too often, not only conceals Truth, but is inclinable to add something in favour of his Conjectures.

Nothing occurs to me so remarkable that you have omitted in relating Mr *Terry's* case, as your Prognostick of her recovery, which indeed you seem industriously to avoid, when it must be your own observations in such difficult cases that made you Master of the consequence, which I cannot forbear putting you in mind of, when you so often encouraged me to expect success in her case, that was generally lookt upon as deplorable. You may remember, that the Matter or *Pus* which first flowed from her side was so offensive in its scent, as obliged the By-standers to quit the Chamber, insomuch that the Nurse usually at the time of dressing and afterwards, was wont to burn Rosemary, &c. to suppress the Stench. So putrid was the *Pus* that it tarnished that end of the Silver Probe I past into the cavity of the Abscess, as it did the top of a Silver Syringe in making Injections. There seems no room to doubt that the *Pus* which then flowed from her side came from the same cavity

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ty the *Pus* did she before Coughed up, when the Liquor that was Injected at her side came into her Mouth ; which she frequently complained of, and particularly of the bitterish taste of the Tincture of Myrrhe I sometimes used in the Injections.

Among the many Disaffections of the parts of Humane Bodies, the Diseases of the Lungs have been lookt on as none of the least dangerous : And indeed if Observations did not assure us of the possibility of success, the commonly known structure of the Lungs would afford us but mean Arguments for the shift Nature makes, in the Instance you have given so exact a Description of, as well as some other Instances of the like Nature I have met with.

About two or three years since, I saw a Boy in the ninth or tenth year of his Age, who (some time before) after a Continu'd Fever was pursu'd with an Intermitting one ; a Cough follow'd, in which he brought up (at short intervals) no small quantity of thick purulent stinking *Pus*, which discharge (I think) continued on him not less than fourteen or fifteen months before I saw him : His Physicians order'd him Issues in his Back, which I made as usual : He had then a healthy Aspect, his Cheeks florid, and was very brisk and active : When he just came from play he was bid to take a Bason in his Hand and Cough as he was wont, which he did, wherein I saw him discharge at his Mouth not less than 4 or 5 Ounces of the sort of *Pus* above-mentioned : This his Mother told me he had been wont to do twice every day ; nor did he appear any ways disordered after, but return'd to play immediately. His Physicians sent him into the Country whence he came, where in about a twelve-month I heard he dyed, but was not acquainted with his circumstances after : What success the operation we practis'd on Mrs *Terry* would have had on this Boy, I dare not determine ; tho I cannot but think it might have been safely done to him and another Patient I was since call'd to,

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but I could not obtain the consent of the Physician that was consulted.

Another instance ( in which a considerable part of the Lungs was obstructed, and consequently became useless, some time before death ) was in a Girl of sixteen, who had been Scrophulous not less than 9 years ; the Glands about her Neck and Throat being very much indurated as well as distended, her Lips and Nose were also swoln : About a year and a half before her death she Coughed up seven or eight ounces of foetid Pus, in less than 24 hours. On changing the Air of this Town for that of the Country, together with the use of Balsamick Pectorals, she recover'd a healthful appearance in her face ; but continued somewhat Asthmatick. On taking cold (as 'tis call'd) her Appetite as well as Digestion fail'd her, she grew Feverish, and dyed after a few days indisposition.

On opening the *Thorax*, I found the Lungs cleaving to the *Pleura* of the Left side, in such manner that they could not be separated, without one of those parts borrowing from the other. A portion of one of the Left *Lobes* of the Lungs being cut off, sunk in Water ; from which part 'twas likely the Matter came which she formerly Coughed up, tho the Ulcer was then closed, and no appearance of Matter was to be seen in that or any other part of the Lungs. The Lymphatick Glands at the divarication of the Windpipe had by their Intumescens so compressed the Canal of the Left side, that it wanted more than two thirds of its proper passage for the Air.

In these, and some other Instances I could produce, it's evident that considerable parts of the Lungs may be Obstructed, and the person survive : but Mr *Terry's* Case demonstrates the Possibility of their recovery when part of their Lungs are totally Obstructed, as must happen in such large Abscesses. But how the remaining sound parts of such diseas'd Lungs become capable of transmitting the whole Mass of Blood from the Right Ventricle  
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of the Heart to the Left, in equal time and quantity with the Blood that Circulates in the rest of the parts, seems not easily accounted for, when indeed it exacts our wonder that it is done in a Natural state, when all the passages of the Lungs are open and free. Since I had often found Water, injected by the *Arteria Pulmonalis*, return readily from the Lungs again by the *Vena Pulmonalis*, I was tempted to try if melted Wax, when very hot, would not do the like, Which succeeded in two young Cats Lungs: for after Injecting the Wax (mixt with Oyl of Turpentine, and tinged with Vermillion) by the *Arteria Pulmonalis*, I found it had fill'd the Pulmonick Vein with the Left Auricle insomuch that some of the Wax had reacht the Left Ventricle of the Heart: I don't remember this Experiment succeeded, but that some of the Wax was extravasated, and came into the *Broncheæ* and Wind-pipe at the same time.

In preparing a Human Heart, by filling its Ventricles, Auricles and Trunks of its large Blood Vessels with Wax, I found on Injecting the Pulmonick Arteries and Veins with Wax differently tinged, that the Wax pass'd from the Veins to the Arteries without coming into the *Broncheæ*, or being extravas'd, tho the Wax was not Injected with near so much force as might be. I must confess I was never so fortunate to make Wax pass from the Arteries to the Veins in Human Bodies or Quadrupeds, unless in their Lungs, as above noted, and the *Spleen* and *Penis*; Nor do I remember it has happen'd in those parts, but when the Wax has been impell'd with great force, tho I have constantly observ'd the Communication of Arteries and Veins of the *Spleen* and *Penis* more open than in other parts except the Lungs. I wish Dr \* *Morland* had told us in what part of the Human Body Dr *Areshkin* had made Wax pass from the Arteries to the Veins, so as to demonstrate their Continuation to the Naked Eye, because I have hitherto found the Naked Eye unable to discover the Extremities of the Arteries and Veins, when the Blood it self was moving in them, in the transparent parts of the

\* Phil Trans.  
act. No 283.  
pag. 1292.

*Omentum* or *Mesentery* of Quadrupeds, or in the Lungs of Frogs or Lizards when living ; or after death when the Blood has been retain'd in their Lungs in the following manner. On making Incision into the Bodies of these Creatures their Lungs will start out, and be distended with Inspired Air ; on which, make what haste you can to pass a Ligature ( *i. e.* a Wax Thread ) and tie it firmly toward the upper part of the Lobe, as near the Heart as you can : When the Lungs of Frogs and Lizards are dried, thus distended, you may examine them with your \* Microscope, and they will appear as represented Fig. 1st, 3d, 4th, 5th and 6th. The first and second Figures shew the difference in the magnitude of the extremities of the Veins and Arteries of the Lungs, and those of the foot of a Frog view'd with the same Microscope.

\* The Microscope used in drawing the Figures is described and Figured Transact. No 281. The manner of applying the

dry'd Lungs here mentioned, is thus, Take out the Glasses in the Slider or flat piece of Ivory, marked in the Fig. of that Transaction, *e. e. f. f.* and, past in the holes *f. f.* parts of the dry'd Lungs as mention'd, whether of Frogs, Toads, Snakes, Vipers, or the like Creatures, that have their Lungs Vesicated as well as Vesiculated; and by this means you may keep objects of the Lungs of those Animals always by you ; some of which I have had this three months, and are now as Beautiful as when first put in ; only you are to remember to place the external smooth surface of the Lungs toward your Object Glass when you view it : In the same manner, the extremities of the Blood Vessels of any Transparent parts of Animal Bodies may be examin'd by that Microscope.

Hence it appears that the Communications between the Arteries and Veins of the Lungs are more open than those of other parts, at least in the Feet of Frogs : And till it can be shewn that Melted Wax can be as easily injected from the Arteries to the Veins of other parts in a Humane Body and Quadrupeds, I shall be inclin'd to think the Communications between the Pulmonick Arteries and Veins in general are more open than the Arteries and Veins of other parts, except the *Spleen* and *Penis*.

This patent Communication of the Arteries with the Veins of the Lungs shews how those Vessels transmit the Blood in equal time and quantity with the Blood that moves  
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in the rest of the Blood Vessels of the whole Body in a healthful state.

Hence it is, when any of the Blood Vessels of the Lungs are streightened or totally compress'd (either or both, which Circumstances must happen in Mrs *Terry's* Case) the remaining unobstructed Blood Vessels are forced to discharge more than they were wont, and in time those Vessels become sufficiently dilated to supply the defect. The like happens in the Communicant branches of the Arteries of any part, when some considerable Branch or Trunk is ty'd up, as in the operation for curing of an \* Aneurism.

Thus, Sir, we find the structure of the parts of Animal Bodies not only sufficient to perform the ordinary operations of Nature, but their *Organs* are so wonderfully made, that notwithstanding considerable parts of those Organs are obstructed, yet their neighbouring parts (as in the case before us, the Blood Vessels) become capable of supplying the defect. This indeed exacts our gratitude as well as admiration of the Divine Architect.

\* Vide Phil. Transact. No. 280. P. 1191. The Patient then mentioned is in perfect health and has recovered the intricate use of his Arm.

## The Explication of the Figures.

*Fig. 1.*

**T**hat part of the 5th Figure at D . . . . done by a larger Magnifying Glass, *i. e.* by the 3d Glass of the Microscope described No 281. of these Transactions.

A The Arteries.

B The Veins of a Frogs Lungs prepared as above-mentioned.

C Their Inosculations with each other.

D . . . . The *Area* of the Microscope, as it appears to the naked Eye.

E e e e e e e e 2

*Fig.*

*Fig 2.*

Part of the hinder foot of the young Frog viewed with the same Microscope when living ; whereby the different magnitude of the extremities of the Arteries and Veins of the Lungs in the first figure, and in this express'd at C C is very evident ; The former being capable of admitting at least three Globules of Blood to pass abreast, whereas the extremities of the Arteries and Veins in the Feet admit of one Globule of the Blood only to pass before the other.

A A The Trunks of the Arteries.

B B Those of the Veins lying by the side of the Toes.

C C Their Extremities continu'd with each other, in the transparent Membrane between the Frogs Toes.

a a Two of the Frog's Toes.

*Fig 3. and 4.*

The extremities of the Arteries and Veins of a Frog's Lungs, viewed with the 4th Glas of the same Microscope, made by *James Wilson*.

A A The Arteries.

B B The Veins.

C C Their conjunctions with each other.

D The *Area* of the Microscope.

*Fig 5.*

One of the *Hexagon Areae* of a Frog's Lungs, which were not so much distended by Inflation, as those parts of the Lungs represented in the two former Figures 3 and 4, whereby the little *Areae* or Cells in the Interstices of the extremities of the Veins and Arteries appear closer and less than in the two foregoing Figures, tho viewed by the same Microscope.

A The

A The Arteries.

B The Veins.

D The *Area*, which is more magnified at Fig the 1<sup>st</sup>.

Fig 6.

The lower part of one of the Lobes of a Water Lizard's Lungs, as it appears by the Microscope, when the Blood is retained in the extremities of the Vessels, as in the preceeding Figures.

A A The Trunk of the Pulmonick Artery.

B B The Vein.

C C . . . Their Branches, joyning with each other.

D D The transparent smooth Membrane, which in this Creature, is not vesiculated, or full of Cells, as in the Lungs of Frogs, on which the Blood Vessels are expanded ; nor does the Internal surface of this Membrane differ from the External, as in Frogs and divers amphibious Creatures. The Lungs of these Water Lizards being vesicated, and not vesiculated.

If, Sir, in this, the Publick or your self meet with any satisfaction, I shall think the time well bestowed, by

*Your obliged*

*Humble Servant,*

Wm Cowper.